

# Freeze-Dryer

Winter 2007

TO: Engineering Development Branch

FROM: Engineering Division

SUBJECT: Freeze-Dryer

The company is considering developing freeze-dried orange juice as a new product and needs design information for the process. A small-scale freeze dryer is available for this purpose. We are also interested in developing reasonable surrogates with which to do process optimization to avoid the natural variations in orange juice itself. Please use the existing apparatus to develop the following data:

1. Drying rate of water
2. Drying rate of a 10% mass solution of fructose in water
3. Drying rate of fresh orange juice.

Determine differences and similarities in the rates of drying and identify the major sources of such variations. Determine from the data and appropriate analysis what major factors control the rate of drying. Discuss the merits of a standardized mixture as a surrogate with which to optimize a new process.